WE CLAIM:

1. A protein sequence comprising an amino acid sequence derived from the $BRCA1^{(omi1)}$ sequence as set forth in SEQ. ID. NO: 2.

2. A protein sequence comprising an amino acid sequence derived from the $BRCA1^{(omi2)}$ sequence as set forth in SEQ. ID. NO: 4.

3. A protein sequence comprising an amino acid sequence derived from the $BRCA1^{(omi3)}$ sequence as set forth in SEQ. ID. NO: 6.

4. A method of determining the consensus genomic sequence or consensus coding sequence for a target gene, comprising:

a) screening a number of individuals in a population for a family history which indicates inheritance of normal alleles for a target gene;

b) isolating at least one allele of the target gene from individuals found to have a family history which indicates inheritance of normal alleles for a target gene;

c) sequencing each allele;

d) comparing the nucleic acid sequence of the genomic sequence or of the coding sequence of each allele of the target gene to determine similarities and differences in the nucleic acid sequence; and

e) determining which allele of the target gene occurs with the greatest frequency.

5. A plurality of oligonucleotide probes each capable of hybridizing to a sample $BRCA1^{(omi)}$ gene having the sequence as set forth in SEQ. ID. NO:1, 3 and 5, or a sequence complementary thereto.

6. A chip array having "n" elements for performing allele specific sequence-based techniques comprising a solid phase chip and oligonucleotides having "n" different nucleotide sequences,

wherein "n" is an interger greater than or equal to seven,

wherein said oligonucleotides are bound to said solid phase chip in a manner which permits said oligonucleotides to effectively hybridize to complementary oligonucleotides or polynucleotides,

wherein oligonucleotides having different nucleotide sequence are bound to said solid phase chip at different locations so that a particular location on said solid phase chip exclusively binds oligonucleotides having a specific nucleotide sequence, and

wherein oligonucleotides are capable of specifically hybridizing to the BRCA1$^{(omi)}$ DNA having the sequence as set forth in SEQ. ID. NO:1, 3 and 5, or a sequence complementary thereto.

7. A method of performing gene therapy on a patient, comprising:

a) contacting cancer cells *in vivo* with an effective amount of a vector comprising DNA containing at least a portion of BRCA1$^{(omi)}$ coding sequence as set forth in SEQ. ID. NO:1, 3 or 5, or a sequence complementary thereto;

b) allowing the vector to enter the cancer cells; and

c) measuring a reduction in tumor growth.

8. The method according to claim 7 wherein said cancer cells have a mutation in a BRCA1 gene.

9. The method according to claim 7 wherein said patient has a mutation in the BRCA1 gene of non-cancer cells.

10. A method of performing gene therapy on a patient or a sample, comprising:

a) contacting cells *in vivo* or *in vitro* with an effective amount of a vector comprising DNA containing at least a portion of BRCA1$^{(omi)}$ coding sequence as set forth in SEQ ID NO:1, 3 or 5 or a sequence complementary thereto; and

b) allowing the vector to enter the cells,

wherein said patient has a reduced susceptibility for developing a cancer associated with a mutation in the BRCA1 gene.

11. A method according to claim 10 wherein said cells include healthy breast, ovarian, prostate, and colon tissues.

12. A method according to claim 10 wherein a patient has an inherited mutation in the BRCA1 gene.

13. A method of treating a patient suspected of having a tumor, comprising:

a) administering an effective amount of BRCA1 tumor growth inhibitor having an amino acid sequence derived from SEQ ID NO:2, 4, or 6, to a patient;

b) allowing the patient's cells to take up the protein, and

c) measuring a reduction in tumor growth.

14. The method according to claim 13 wherein said tumor is a breast cancer, an ovarian cancer, a prostate, or a colon cancer.

15. The method according to claim 13 wherein said patient has an inherited mutation in a BRCA1 gene.

16. A method of preventing the formation or growth of a tumor, comprising:

a) administering an effective amount of BRCA1 tumor growth inhibitor having an amino acid sequence derived from SEQ ID NO:2, 4, or 6, to a patient suspected of having an inherited mutation in a BRCA1 gene; and

b) allowing the patient cells to take up the protein.

17. The method according to claim 16 wherein the protein is administered parenternally, by buccal adsorption or inhalation.

18. A cloning vector comprising:

(a) a DNA sequence as set forth in SEQ. ID. NO: 1, SEQ. ID. NO: 3, SEQ. ID. NO: 5, or any fragments thereof; and

(b) one or more suitable regulatory sequences to induce replication and/or integration in a host cell.

19. An expression vector comprising a DNA sequence as set forth in SEQ. ID. NO: 1, SEQ. ID. NO: 3, SEQ. ID. NO: 5, or any fragments thereof operatively linked to one or more promoter sequences capable of directing expression of said sequence in a host cell.

20. A host cell transformed with the vector according to any one of the claims 18 and 19.

21. A BRCA1 polypeptide which is selected from the group consisting of:

(a) a fragment of BRCA1$^{(omi)}$ protein sequence as set forth in SEQ. ID. NO: 2, SEQ. ID. NO: 4, or SEQ. ID. NO: 6;

(b) an amino acid sequence which is substantially homologous to the BRCA1$^{(omi)}$ protein sequence as set forth in SEQ. ID. NO: 2, SEQ. ID. NO: 4, or SEQ. ID. NO: 6;

(c) a molecule which has similar function to the BRCA1$^{(omi)}$ protein; and

(d) a fusion protein of (a), (b), or (c).

22. An anti-BRCA1 antibody wherein a molecule according to any one of the claims 1-3, and 21 is used as an immunogen.

23. A diagnostic reagent comprising a molecule selected from the group consisting of:

(a) a DNA sequence as set forth in SEQ. ID. NO: 1, SEQ. ID. NO: 3, SEQ. ID. NO: 5, or a sequence complementary thereto;

(b) a nucleic acid fragment of (a) comprising at least 10 nucleotide in length;

(c) a sequence which hybridizes to (a) or (b);

(d) a polypeptide according to any on eof the claims 1-3 and 21; and

(e) an antibody which specifically binds to the polypeptide of (d).

24. A pharmaceutical composition comprising a molecule according to any one of the claims 1-3 and 21 in a pharmaceutically acceptable carrier.

25. A pharmaceutical composition comprising a molecule according claim 22 in a pharmaceutically acceptable carrier.

26. A pharmaceutical composition comprising a molecule according to claim 23 in a pharmaceutically acceptable carrier.